Attachment F: Technical Proposal

Requirement

2.4.1   Describe the history of the commercial or off-the-shelf product, including information regarding the original purpose of the product.

* It is anticipated that at least 80% of the Indiana items would be met through common item types, such as text entry, multiple choice, and multiple select items. Additional items types (such as table match, graphing items, and performance tasks) may require configuration in the product.

Response

Item Banking Experience

Pearson has over 15 years in Item Banking experience—including 5 years of partnering with IDOE—evolving our item banking capabilities alongside technology and partnering with industry leaders to develop interoperability standards for creation and transfer of item content.

Pearson's latest and state-of-the-art authoring, banking, test form building, and publishing platform, Assessment Banking and Building for Interoperability (ABBI), is specifically designed to handle online, interactive, and accessible content. Since 2015, ABBI has provided a single unified interface for the following:

▪ Authoring test content and all associated content assets

▪ Banking content elements and metadata

▪ Building test forms

▪ Publishing test forms for online or paper delivery

ABBI leverages decades of experience designing and building the best-in-class assessment content management systems that meet the demands of high-stakes testing. By incorporating the latest in open technologies, open interoperable standards, assessment design, and online delivery capabilities, ABBI can move beyond the high-stakes world and support a broad range of IDOE needs.

ABBI is designed to support the entire assessment content development life cycle. From initial content authoring, through content review cycles, to form construction and publishing, and finally through field testing and post-administration data analysis, ABBI is the authoritative source for all content, data, and functionality for IDOE.

ABBI supports a full spectrum of item types from simple multiple-choice items to complex technology enhanced items; all item types are enabled through easy-to-use interfaces, which allows the author to build out complex functionality piece-by-piece. Online help is available at every step. Please see our response to requirement 2.4.4 for a list of supported item types in ABBI.

ABBI in Indiana

IDOE has had a 5-year history with using ABBI. In 2015, Pearson was awarded the Indiana contract for the ISTEP and IREAD programs. These programs began using ABBI for content development through forms construction. In 2018, the Indiana End-of-Course Assessment was added to ABBI as a separate bank, which houses English/Language Arts and Mathematics assets. In January 2020, the Indiana

Learning Evaluation Assessment Readiness Network (ILEARN) and Indiana's Alternate Measure (I AM) graphics banks were added to ABBI; IDOE staff were trained on how to author their own assets and create their own art in ABBI.

Requirement

2.4.2   IDOE requires adherence to the Question and Test Interoperability (QTI) and Accessible Portable Item Protocol (APIP) standards, including any IMS Global Learning Consortium certifications (https://www.imsglobal.org/activity/qtiapip).

Confirm the product's adherence to the Question and Test Interoperability (QTI) and Accessible Portable Item Protocol (APIP) standards, and include any IMS Global Learning Consortium certifications.

Response

Promoting Interoperability and Accessibility

IDOE will benefit from Pearson's continued support and investment in industry standards, protocols, and frameworks. Pearson works closely with standards organizations to develop and enhance their content and metadata standards to improve interoperability and accessibility.

For more than a decade, Pearson has been a leader in developing, implementing, and promoting open industry standards for item- and test- content and accessibility features. Most recently, we co-led the design and development of IMS Global's Question and Test Interoperability (QTI) specification, which the Smarter Balanced assessment consortium has adopted as part of its strategy for opening access to a wider range of service providers to deliver and score its test content.

All of Pearson's assessment content authoring, banking, test delivery, and scoring systems are based on the IMS Global's QTI and the Accessible Portable Item Protocol (APIP) standards. Our guiding principles are to work within the standard's framework and document all extensions that may be used to implement innovative functionality not natively supported by the standard.

QTI and APIP Compliance

Pearson's ABBI platform is QTI compliant and serves as the central "hub" for all pre-test and post-reporting assessment life cycle activities. Built from the ground up on QTI and APIP open industry standards, ABBI supports more than 70 different interaction types and options, a full range of accommodations and embedded supports, sophisticated yet flexible workflow management, authentic presentation and scoring preview, and integrated test form construction and publishing tools for both paper and online forms.

Pearson has successfully developed, delivered, or exchanged more than 2.5 million assessment items using the IMS Global QTI 2.1/2.2 specification, as well as other versions of QTI. ABBI natively supports QTI 2.1, QTI 2.2, and QTI 3. With QTI 3, less normalization is required, because it includes an extended shared vocabulary for item interactivity and layout.

To continue improving interoperability standards for content and metadata, Pearson maintains a leadership role in defining and supporting Extensible Markup Language (XML), QTI, and WCAG for accessibility. This provides new opportunities to increase content and metadata portability for your assessments. Isolated, non-compliant testing platforms cannot keep pace with changing regulatory demands or offer the efficiency of interoperable systems.

Requirement

2.4.3   Describe the product's update history, communication strategies utilized to inform IDOE of the ongoing updates, and methods used to request enhancement features to the product.

Response

ABBI Update History

Updates to ABBI are documented on the ABBI Support page. This documentation includes detailed notes with images to aid in identifying any new features and functionality of each release. The outage notification is also posted on the ABBI Support page with a link to the release information.

In addition, the ABBI Support team sends an outage notification email to the Pearson point of contact for each program using ABBI. This email includes the purpose for the release, the scheduled date, time, and expected duration, plus a link to the ABBI Support page release information. The Pearson point of contact will share the email with their Indiana Item Bank and Authoring System contacts.

Please share the following information with your ABBI users, particularly the client, vendors, contractors, item writers/authors, and reviewers.

ABBI Planned Maintenance

A message from the ABBI team

What is happening?

ABBI Operations will be performing maintenance on the ABBI servers to deploy Version 1.60.0.5 patch. The release description for ABBI 1.60 can be found here.

When is it happening?

Date: September 17, 2020 (Thursday evening)
Time: 7:00 p.m. - 11:00 p.m. Central Time
Duration: 4 hours

Who will be affected?

The outage will impact all ABBI users and all projects.

What do you need to do?

Save your work and log off of the ABBI system at least 15 minutes prior to the scheduled outage.

If you are a point-of-contact for any active contractors or item writers who may be working in ABBI during this time, please notify them about this ABBI outage.

Thank you,

The ABBI Team

ABBI Update Notification. In addition to notifications on the ABBI support page, Pearson provides update and outage notifications via email.

Requests for Enhancement Features

Our Application Support team will regularly review upcoming releases to discuss applicability of new features to the Indiana Item Bank and Authoring System. We will facilitate discussions with our development team regarding IDOE requests for new features or functionality.

System Maintenance

As with all information technology solutions, patches, updates, and fixes to unexpected events need to be deployed from time to time. Pearson establishes regular maintenance windows and coordinates with customers as needed for minimal interruption to assessment services. Our goal is to communicate well in advance about any update or system downtime that may be necessary.

Vulnerability Management and Patching

Patches are released periodically by the manufacturers of Pearson's underlying system components, devices, platforms, and applications. Each patch undergoes an assessment to determine applicability, risk, and if there are mitigating controls that already exist.

If the assessment determines a patch to be necessary, it is applied in a test environment where it is regression tested to verify the patch works and does not negatively impact the assessment platform. Once regression testing completes, user acceptance testing is performed to confirm the platform is fully operational. If the patch passes this test, then we send notification, as applicable, to affected customers and release the patch into the production environment through a standardized control process.

Change Management

Our change management processes are designed to reduce the risk of service interruption and degraded performance, as well as to ensure all changes made to production systems are authorized. Rigorous adherence to change controls throughout the system development lifecycle works to ensure successful implementation on the first attempt.

The process includes:

- Acknowledgement and record of changes

- Assessment of the impact to the cost, benefit, and risks of proposed changes

- Management approval

- Management and coordination of implementation

- Closure review

Requirement

2.4.4   Describe how the product allows for item authoring in the system, (including a variety of item types and art or graphics associated with items) and the extent that IDOE staff can own or manipulate the configuration of the system. Displays (screenshots or pdfs) of these features should be included in the proposal. A timeline of training opportunities for IDOE staff to learn the system, and ongoing support should be highlighted.

Response

Simplified Item Authoring

ABBI makes it simple for even a novice user to create, edit, and preview an item. The easy-to-use authoring interface currently supports 24-item interactions:

- Audio Capture
- Bar Graph

- Inline Choice
- Match

- Choice
- Drawing
- Extended Text
- Equation Editor
- Fraction Model
- Function Graph
- Gap Match
- Gap Match—Table
- Graphic Gap Match
- Hot Spot
- Hot Text

- Match—Table Grid
- Number Line
- Order
- Point Graph
- Shape Transformation
- Slider
- Solution Set
- Text Entry (Fill-in)
- Text Extractor
- Zoom Number Line

More interactions can be easily added by plugging into a common, flexible infrastructure. All interactions are developed to align with the open QTI interoperability specification—including custom portable interactions (or PCI).

Item Examples

Following are some graphic examples of supported item types including drawing, hot text, point graph, and text extractor.

Drawing
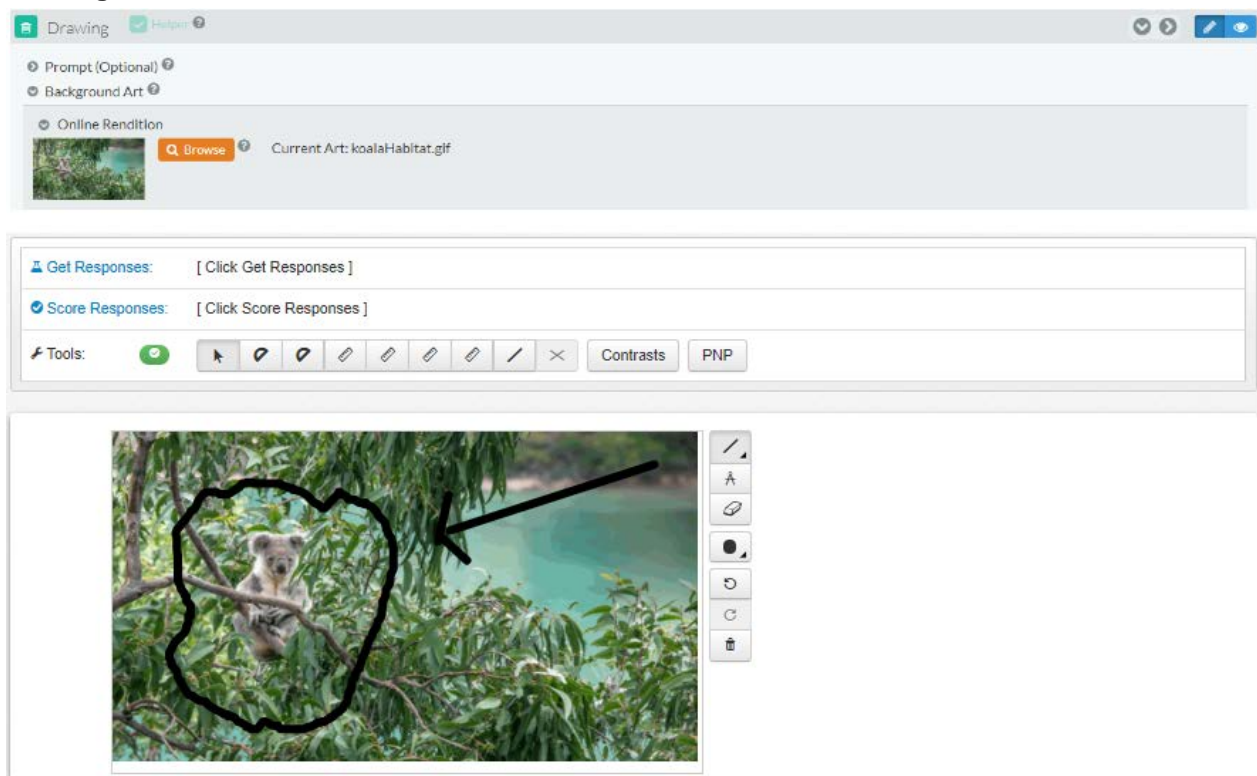
Hot Text

🗑 Hot Text ❓   ⌄ ❯   ✏ 👁

❯ Prompt (Optional) ❓
⌄ Text with Inline Hot Text ❓   ⬇ Import Passage ❓

Edit ▾   Style ▾

B *I* U x² x₂ ☰ ▾ ☰ ▾ ⇥ ⇥ Ω √ <> ↶ ↷ • Tag

The New Ruler of the Everglades

① Not long ago, people looking for an unusual and interesting pet could buy a baby Burmese python at a pet store. Pet stores imported these popular snakes to the United States from Asia. The baby pythons were about 12 inches long, and they cost only about 20 dollars. But owners were in for a surprise. Their little pet quickly outgrew its cage. In one short year, that cute baby python turned into an enormous snake more than five feet long! What could the pet owners do?

② In Florida, where pythons were once popular pets, some owners released their unwanted snakes into Everglades National Park. The pythons adapted well to the wilderness area. As time passed, park rangers received reports of python sightings. In 2006, the rangers found python nests with eggs. The snakes had moved into the park to stay.

P

👤 Get Responses: [Click Get Responses]
✔ Score Responses: [Click Score Responses]
🔧 Tools: ⬤   ➤ ✎ ✎ ✐ ✐ ✐ ✐ ╱ ✕   Contrasts   PNP

The New Ruler of the Everglades

① Not long ago, people looking for an unusual and interesting pet could buy a baby Burmese python at a pet store. Pet stores imported these popular snakes to the United States from Asia. The baby pythons were about 12 inches long, and they cost only about 20 dollars. But owners were in for a surprise. Their little pet quickly outgrew its cage. In one short year, that cute baby python turned into an enormous snake more than five feet long! What could the pet owners do?

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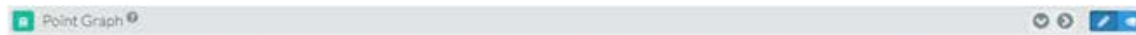
A Hardy Newcomer

Part A

What information in "A One-Inch Invader" helps the reader understand the overall structure?
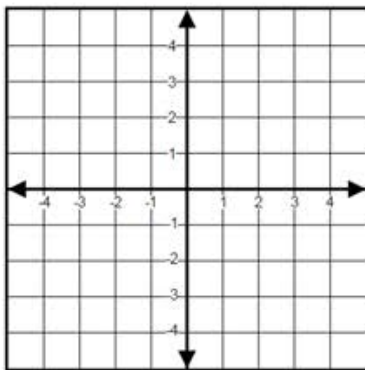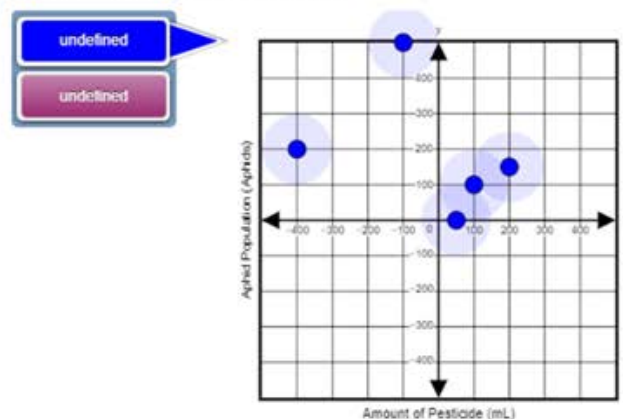
Point Graph

A farmer decides to monitor aphid populations while applying different amounts of pesticide. The data collected is shown in the table.

Amount of Pesticide (mL)	100	200	300	400	500
Aphid Population	600	450	350	150	50

Plot the data shown in the table.

Select a location on the graph to plot each point.

This preview does not reflect actual values selected.

▲ Get Responses:	[Click Get Responses]
✔ Score Responses:	[Click Score Responses]
✦ Tools:	● ▶ ◍ ◍ ✐ ✐ ✐ ✐ ╱ ✕ [Contrasts] [PNP]

A farmer decides to monitor aphid populations while applying different amounts of pesticide. The data collected is shown in the table.

Amount of Pesticide (mL)	100	200	300	400	500
Aphid Population	600	450	350	150	50

Plot the data shown in the table.

Select a location on the graph to plot each point.

Text Extractor

Ease of Use

Even a beginner can create highly interactive items while hiding the complex XML encoding through ABBI's intuitive authoring interface. With ABBI's speed and responsiveness, users can adjust item content or parameters, and preview the item to see if changes meet IDOE expectations.

Additionally, ABBI supports custom code modules, including sections of XML, JavaScript Object Notation (JSON), or JavaScript. The code or mark-up for these custom interactive objects can be edited directly in ABBI using XML editing mode. With this capability, custom item types can be imported and maintained.

Users can define and verify scoring rules for even the most complex composite or dependent scored items. For composite items, users can select from a set of standard, pre-defined scoring models and ABBI does the rest. If users are uncertain that everything is correct, the online previewing capability allows them to check scoring to verify that it is working as planned. Responses can be created with the same interface a test taker would use.

ABBI supports the inclusion of all online accessibility features—from pop-up glossaries to screen reader navigation anchors. For graphical content elements, alternate text is available enabling a screen reader to describe an image to a visually impaired student. For math content (known as MathML), ABBI also supports auto-generated alternate text that describes the math. This text is available for review and modification by content authors.

Accessibility

With many assessment content management systems, accessibility is often pushed to the end of the development lifecycle, violating the very principles of universal design. With ABBI, accessibility features are available with each content element as the item is being developed. ABBI does not require the replication of the item to facilitate adding accessibility content elements which would increase content maintenance costs. In many cases, the same item content can be extended with accessibility features such as:

- Accessible Rich Internet Applications (ARIA)-labels for screen readers to recognize interactive content elements

- Alternative text available for graphical content as well as math

- Pronunciation mark-up for text-to-speech and screen readers and the capability to create customized alternate text descriptions depending on the accommodated form type. This includes phonetic markup for pronouncing specific words, acronyms, or abbreviations.

- Sign language videos, closed captioning can be included with the content

- Read-aloud audio can be included with the content

- Large-print versions of the artwork can be associated with the content

Without any technical knowledge, your users can generate structured mark-up for web content accessibility guidelines (WCAG) compliance. For example, when adding passage titles, subheadings, and item part labels, the same mechanism that applies the proper style also applies structured mark-up. Therefore, screen readers will be able to easily navigate each program's content.

System Configurations

Secure and scalable content repositories are the bedrock of ABBI's content banking system. Built on top of the repositories is a range of powerfully smart tools that allow users to create, review, modify, track, and link the content in efficient, productive, and useful ways. By making IDOE content banks highly configurable, ABBI quickly becomes a familiar toolset that allows users to concentrate on work, rather than the software tools. It can be organized into three tiers:

- **Tier 1: Bank:** This highest-level structure is generally thought of as the container content assets will live. IDOE can have as many banks as needed. Users can choose how to segregate content into banks to meet security, item usage, or test construction needs.

- **Tier 2: Subject- or Content- Area:** The second tier can be defined as users prefers, but typically it represents a subject- or content- area. This tier may have values such as Math, Science, ELA, etc. This also provides a level of content segregation, metadata configuration, and security.

- **Tier 3: User-defined:** The third tier can also be defined as users prefers, but typically this tier represents a grade or level. This tier may have values such as Grade 1, Grade 2, or High School, etc. This is the lowest level of content segregation, meta data configuration, and security.

Content repositories track all types of IDOE content assets—from test items, art, and reading passages to scoring rubrics and metadata. Each asset has full revision history. This enables users to track program assets throughout the entire development lifecycle.

Assets can be linked together in a variety of ways. For example, items can be linked to reading passages, assets can be associated with multiple learning standards, and assets can carry a customer-defined set of metadata.

IDOE Item Bank Configuration

Specific to IDOE banks in ABBI, item metadata has included Primary IAS, Secondary IAS, 2016 IAS, 2016 Strand; Reporting Category; Estimated Quintile (options 1-5); Title (of passage/stimuli), Review Sequence (for committee reviewers); DOK; Key (client-facing); Item Type (client-facing); Active Tab (indicates order of passages to show with the item); Item Enemy; Notes; Calculator (options Y, N, X); and Text to Speech Language, Voice and Speed.

The Indiana bank in ABBI currently contains the following IDOE standards:

- ISAT Mathematics and English/Language Arts standards for grade 10
- IREAD standards for grade 3
- ILEARN standards for English/Language Arts
- Mathematics, Science, and Social Studies grade 5
- I AM standards for English/Language Arts, Mathematics grades 3–8, Science, and Social Studies

The ABBI Support team will add Social Studies, U.S. Government and I AM Mathematic standards for grade 10.

Training Methodology

Pearson will schedule a Needs Analysis as part of the program kick-off, shortly after contract award. As part of the Needs Analysis, Pearson will provide an overview of all functionality and training options. Pearson will provide IDOE documentation which outlines all functionality and training options, and IDOE can easily identify which of these options they would include in their training plan. Pearson will draft a training plan and seek IDOE feedback within the first month of contract kick-off.

Suggested Training Timeline

Following is a suggested training timeline. The final actual timeline will be finalized with IDOE.

Suggested Training Timeline	
Task	**Timeline**
Virtual Program Kick-off and ABBI Needs Analysis	January 2021
Overview of ABBI and review of training options	January 2021
ABBI Training Plan, review and approval by IDOE	February 2021
ABBI Training Implementation begins, Support Materials provided to IDOE	March 2021

Training and Meeting Changes in Response to COVID-19

Pearson is committed to the health and safety of both our personnel and those of our customers. As IDOE already experienced in Spring of 2020, we have plans in place to continue to successfully pivot training and meetings from in-person to virtual mode, depending on conditions concerning the spread of COVID-19.

Requirement

2.4.5   Describe the hierarchy associated with user designations for the product and explain the available user capabilities associated with each designation.

Response

Sophisticated Role-Based Security

ABBI features a sophisticated role-based security system that enforces control over who can access the banks. It further manages which content areas, grade levels, timeframes for access, and system functionalities each authorized user can access. For example, an IDOE committee reviewer may have view-only access for a limited period, while an IDOE user working on a single subject and grade can be granted access to only a small portion of the bank.

User Access. Access to information and data in ABBI is controlled by a role-based security system.

For all programs, ABBI sets up default roles that determine asset access per tasks and statuses. There are 10 parent roles, each with any number of child sub-statuses. Each user can only be assigned one role that encompass a specific set of permissions. For example, an IDOE user with an Editor Reporter role may request a temporary role change to a Review role. With the Review role, the IDOE user will be limited in their access to assets they can view in the bank. With this role the IDOE user can view the items just like the committee members will see them, and confirm the assets shown are the ones to be reviewed. The IDOE user will also be able to vote, comment, and assist a committee member during the review. After the committee review the IDOE user's role will be changed back to Editor Reporter. We can add new roles, and users can move to different roles depending on the tasks they need to perform.

Standard roles include item writers (for item authors), Editor, and Reviewer. Permissions associated with these roles determine which assets a user can create, edit, or review, as well as in which status(es) those tasks can be accomplished. The following images show examples of standard role permissions.

Most Common end user role:

☐ EditorReport_wForms	No Users	canAccessExpertMode canAccessReport canChangeMyPassword canCreateEditDeleteVoteComment canCreateItem (All) canCreateStimuli (All) canEditItem (All) canEditStimuli (All) canManageForms	canViewAccessibilityAttachment canViewDevelopmentAttachment canViewItem (All) canViewMyVoteArchive canViewScoringAttachment canViewStimuli (All) canViewStimuliAttachment canViewVoteArchive

Typical Committee Reviewer role:

☐ Reviewer	No Users	canCreateEditDeleteVoteComment canViewAccessibilityAttachment canViewItem (Rev)	canViewScoringAttachment canViewStimuli (Rev) canViewStimuliAttachment

Typical Psychometrician role:

☐ StatsManager	No Users	canAccessContentImport canAccessExpertMode canAccessReport canChangeMyPassword canCreateEditDeleteVoteComment canManageForms canManageStats	canViewAccessibilityAttachment canViewDevelopmentAttachment canViewItem (All) canViewMyVoteArchive canViewScoringAttachment canViewStimuli (All) canViewVoteArchive

Item Author roles:

☐ ItemWriter1	No Users	canChangeMyPassword canCreateEditDeleteVoteComment canCreateItem (All) canEditMyItem (Au) canViewDevelopmentAttachment	canViewMyItem (Au) canViewMyVoteArchive canViewScoringAttachment canViewStimuliAttachment
☐ ItemWriter2	No Users	canChangeMyPassword canCreateEditDeleteVoteComment canCreateItem (All) canEditMyItem (Au) canViewDevelopmentAttachment	canViewMyItem (Au) canViewMyVoteArchive canViewScoringAttachment canViewStimuli (Dev, Rev) canViewStimuliAttachment
☐ ItemWriter3	No Users	canChangeMyPassword canCreateEditDeleteVoteComment canCreateItem (All) canCreateStimuli (All) canEditMyItem (Au) canEditMyStimuli (Au)	canViewDevelopmentAttachment canViewMyItem (Au) canViewMyStimuli (Au) canViewMyVoteArchive canViewScoringAttachment canViewStimuliAttachment
☐ ItemWriter4	No Users	canChangeMyPassword canCreateEditDeleteVoteComment canCreateItem (All) canCreateStimuli (All) canEditMyItem (Au) canEditMyStimuli (Au) canViewDevelopmentAttachment	canViewMyItem (Au) canViewMyStimuli (Au) canViewMyVoteArchive canViewScoringAttachment canViewStimuli (Dev, Rev) canViewStimuliAttachment

Pearson will continue to work with IDOE to establish roles and permissions for users. Changes to role permissions or user role can be made by request. Pearson can also create special roles with permissions specific to IDOE.

2.4.6   IDOE requires support for the development of new items. Describe the level of support associated with the solution, both during the initial phase of implementation and ongoing assistance throughout the duration of the contract.

This includes, but is not limited to the following:

- Respondent must provide training and ongoing support to IDOE staff regarding the utilization and access of all system features.
- Respondent must provide a manual that describes the process of authoring each item type into the system.

Response

ABBI Support and Training

Our Application Support team leads efforts to establish processes, best practices, and strategies associated with ABBI. They create and deliver extensive training and professional development to employees, content development authors, and partners to maximize the potential in the tools ABBI provides throughout the item and test development process.

Pearson Application Support primarily assists asset developers, editors, and psychometricians, both internal and external to Pearson. The team's mission and training are guided by the needs of our customers. Based on information gathered at the initial virtual kickoff meeting and during the initial configuration process, we will collaborate with the IDOE team to design a comprehensive training plan. Our training designers and facilitators are skilled in customizing training sessions to meet the varied needs of ABBI users. We provide training to professional content authors, partners who are developing content in ABBI, Department of Education users, and state educators.

Application Support has established a successful professional development and training model with IDOE where real-time learning was immediately applied to outcomes. Skills and knowledge from collaborative and interactive training were readily used to immediately produce exemplary content by IDOE.

The process for ABBI training design and implementation includes Pearson providing:

- Overview / Demonstration of ABBI
- ABBI training needs analysis (process described below)
- ABBI training plan for IDOE's approval. This plan will include:

    1. Number of and schedule for training sessions.

    2. Detailed agendas for each session outlining specific topics to be covered.

    3. Detailed list of training documentation to be provided.

    4. Process for feedback and ongoing support.

ABBI Training Needs Analysis

As noted in response to requirement 2.4.4, Pearson will schedule a Needs Analysis as part of the kick-off and configuration process. As part of this process, Pearson will provide an overview of all possible functionality and training needs. IDOE staff will then be provided documentation which outlines the functionality and training options, and IDOE staff can easily identify which of these options they would include in a training plan. Pearson will take this information and draft a training plan as outlined earlier in this response. IDOE staff will provide feedback, and Pearson will modify as needed.

The team maintains an extensive repository of training materials. This is a dynamic collection of training materials which is updated regularly to reflect new releases and functionality. These resources will be available to the IDOE team through the ABBI Support site.

- ABBI User Guide—Accessing and Navigating ABBI

- Best Practices User Guide—Interaction Types Overview

- User Guide—Passages and Stimuli

- Job aids for each item and interaction type

- Job Aids for Scoring Applications in ABBI

- On Demand, Live-action webcasts demonstrating the process for creating most interaction types

The following examples of our robust repository of guides, job aids, and web casts are provided in Appendix 1 at the end of the Technical Response. Please note that these are considered confidential and proprietary materials.

Sample Training Agenda

Following the Needs Analysis and Training Plan development, Pearson will work with IDOE to implement the training plan. Pearson can schedule the virtual training kick-off after the training plan is finalized and as soon as is feasible for IDOE. A sample training agenda is included below:

Sample ABBI Training Agenda

- Welcome and Introductions

- Overview of Agenda and Goals for Demo

- ABBI Overview
    - Security
    - Passwords
        - Roles/Permissions

    - Tabs
        - Content
        - Forms
        - Stats

    - Asset List
        - Searching/Filtering
        - Batch Review

    - Metadata

A more detailed Training Agenda example is provided in Appendix 1 at the end of this response. Please note this is considered confidential and proprietary material.

ABBI Support Team

IDOE's first line of support is through your assigned program team. For project-specific inquiries, asset-specific issues, and security, users can email the ABBI Support team. With access to all programs, the ABBI Support team can readily view the bank and address the specific issue. If the issue requires input from the broader ABBI team, the ABBI Support group will escalate the issue accordingly.

ABBI Support Site

Authorized users can access the secure ABBI Support site, pictured below. In addition to accessing a wide variety of material. Users can post general questions to this site for the ABBI Support team, which regularly monitors this page.
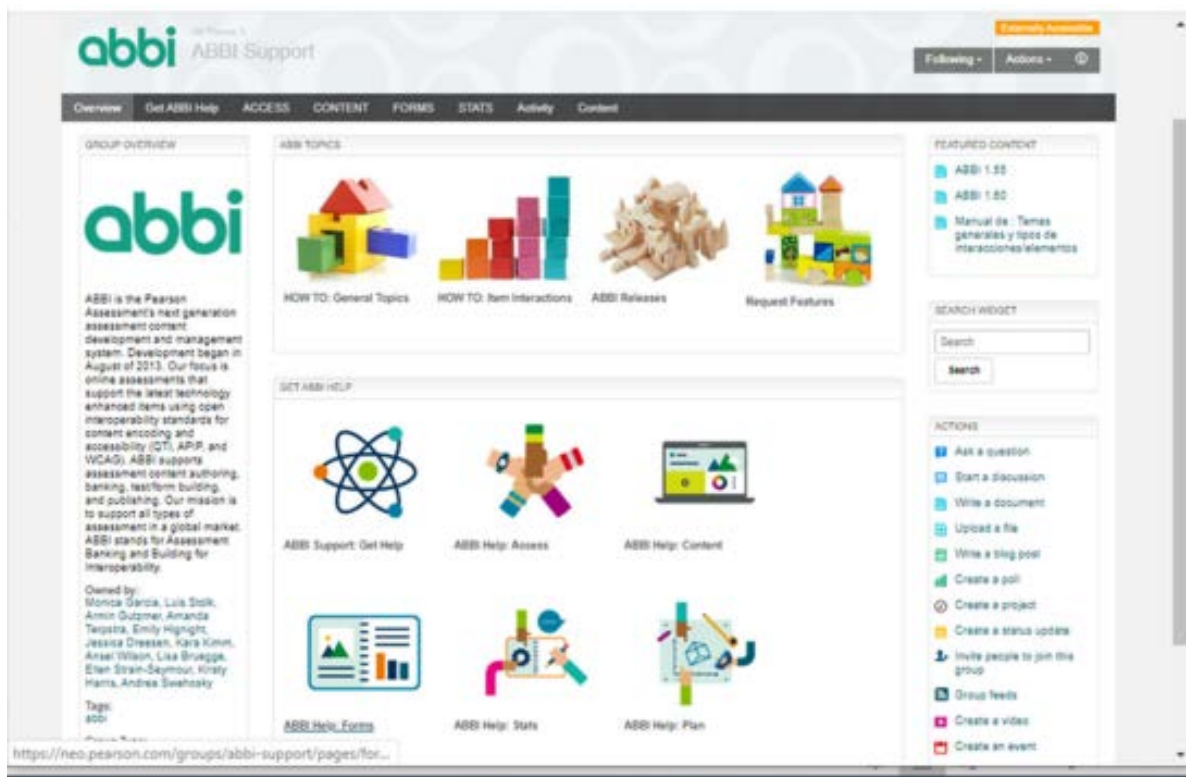
ABBI Support Site. This site is the main channel for ABBI end-user support, providing materials ranging from basic ABBI information to more advanced topics such as creating different item interactions and building forms.

Pearson will provide clear communication to IDOE staff about where and how to access all training and support resources.

Requirement

2.4.7   Provide assurances that the program is compliant with 508 accessibility standards.

Response

ABBI was designed to support the development of assessment content that complies with Section 508 of the Rehabilitation Act. Through support of standards like QTI and APIP, ABBI encodes content to support the use of accessibility features and accommodations. In addition, ABBI produces content that is aligned to the Web Content Accessibility Guidelines (WCAG) version 2.0., AA. WCAG 2.0, AA is the basis of the quantitative measures of technical requirements that are outlined in the 2017 revision of Section 508 of the Rehabilitation Act. Pearson is actively involved in the development of accessibility standards, which keeps us updated on changes to relevant guidelines irrespective of their inclusion status in state or federal regulations.

2.4.8   Provide a sample timeline of item imports and subsequent reviews of items into the system used by other clients.

Response

The draft timeline in the following figure shows a high-level overview of activities and milestones for IDOE bank migration by end of March 2021 (per Attachment G—Question and Answers template). Although the timeline is aggressive, our professional approach to planning, executing, and monitoring project delivery, along with our two decades of experience in successfully transitioning states like Indiana to our authoring and item banking platforms, will help us meet the required deadline.

However, in order to migrate the items into ABBI by the end of March, timely decision-making and fast-tracked handoffs of the IDOE item bank files to Pearson will be critical and that work must begin the first week of January 2021.

Draft Timeline		
Task	**Month**	**Details**
Contract award and Authorization to Start Work	January 4, 2021	
Receive First Batch of Packaged Files from IDOE or Test Vendor	January 5, 2021	▪ Pearson set-up and validation of item xml, metadata systems and tools. ▪ Publishing department begins transform, imports and verifies item content and scoring.
Virtual Program Kickoff Meeting	January 6, 2021	▪ Pearson meets with IDOE staff to define ABBI requirements, discuss handoffs, processes and schedule and execution
ABBI Requirements Gathering Complete	January 14, 2021	▪ Pearson and IDOE collaborate on ABBI specifications and requirements templates
Receive Last Batch of Packaged Files from IDOE or Test Vendor	January 20, 2021	▪ Pearson receives last batch of packaged files from IDOE. ▪ Publishing department continues with transform, imports and verifies item content and scoring. Content metadata and stats are then loaded and verified by Pearson.
ABBI Set-up, Configuration and Readiness Review Complete	January 2021	▪ Pearson configures ABBI according to IDOE approved ABBI specifications and requirements; IDOE approval of the Pearson hosted virtual walk-through meeting of the ABBI IDOE bank
ABBI Training Needs Analysis and Training Plan	January 2021	▪ Pearson and IDOE review documentation and identify training needs
ABBI Training and Support Materials	March 2021	▪ Pearson finalizes training and support materials
Migration of IDOE Item Bank to ABBI Complete	March 2021	▪ Pearson completes migration of IDOE item bank by end of March 2021
Export Content out of ABBI	Yearly	▪ Pearson exports item content and metadata on yearly basis, or as mutually agreed upon by both parties.

We understand the project initiation dates summarized above may be aggressive, but we feel it's important to be transparent with what will be required to successfully achieve an end of March deadline given RFP award recommendation will occur in January.

Pearson's plan will be to meet with IDOE staff to gather requirements for the bank and collaborate on a fast-tracked approach. Pearson recommends receiving a large portion of the bank, including a variety of item types and passages, by January 5, 2021, and the rest of the bank may flow to Pearson in batches through January 20, 2021.

If IDOE requires additional time to award, review requirements and/or handoff the item banks, Pearson is here to support you and we will work with IDOE to discuss and prioritize project objectives and create a mutually agreeable process and project schedule. Such discussions may include but not be limited to which content of the bank should be prioritized and migrated first (in order to be ready to be deployed in time for the spring 2022 assessments), and which content can be loaded in subsequent batches.

Requirement

2.4.9   Describe common metadata fields (including, but not limited to item ID, content area, grade, depth-of-knowledge value, answer key, item type, classical statistic values, item response statistic values, scoring type, etc.) associated with alignment to state standards, accessibility and tagging interfaces.

Response

As described earlier, IDOE will quickly see the benefit that Pearson has invested in continued support of industry standards, protocols, and frameworks. We monitor updates from standards organizations as they develop and enhance their content and metadata standards to improve interoperability and accessibility. To that end, ABBI supports many metadata fields, including the following:

- Item ID—UIN (Unique Identification Number)
- Content Area and Grade—these are shown as a drop-down list pertinent to the bank, i.e., ILEARN>Mathematics>Grade 4; IREAD>Reading/Literacy>Grade 3
- Alignment to standard or content specification—Primary IAS, Secondary IAS
- Depth of Knowledge (DOK) with single select options 1, 2, 3, 4
- Key—Simple Response Key (XML), Per Response Alpha MC Key (XML), Per Response Numeric MC Key (XML), Key (client created) I.e., ISTEP single select options A, B, C, D, Not Applicable
- Item Type—Interaction Types (XML), Item Type (client created) with selection options, i.e., ILEARN.English/Language Arts options MC, TE, CR, ER, WP
- Classic Stats Values

- Item Response Theory parameters
- Scoring Type—Number of Scored Responses (XML), Scored Response IDs (XML), Per Response Scoring Destination (XML), Score Template (XML), Scoring Destination (XML), Trait Score IDs (XML)
- Accessibility
- Use history (dates and exposure count of prior item use)
- Associated Stimulus
- Enemy items (items that should not be included on the same test)
- IDs of author, reviewers, accessibility feature editors, etc.
- Licensing information
- Author and reviewer notes
- Text complexity rating

R e q u i r e m e n t

2.4.10   Describe the availability of the product during the course of the year, including down-time when the product will be inaccessible for use.

R e s p o n s e
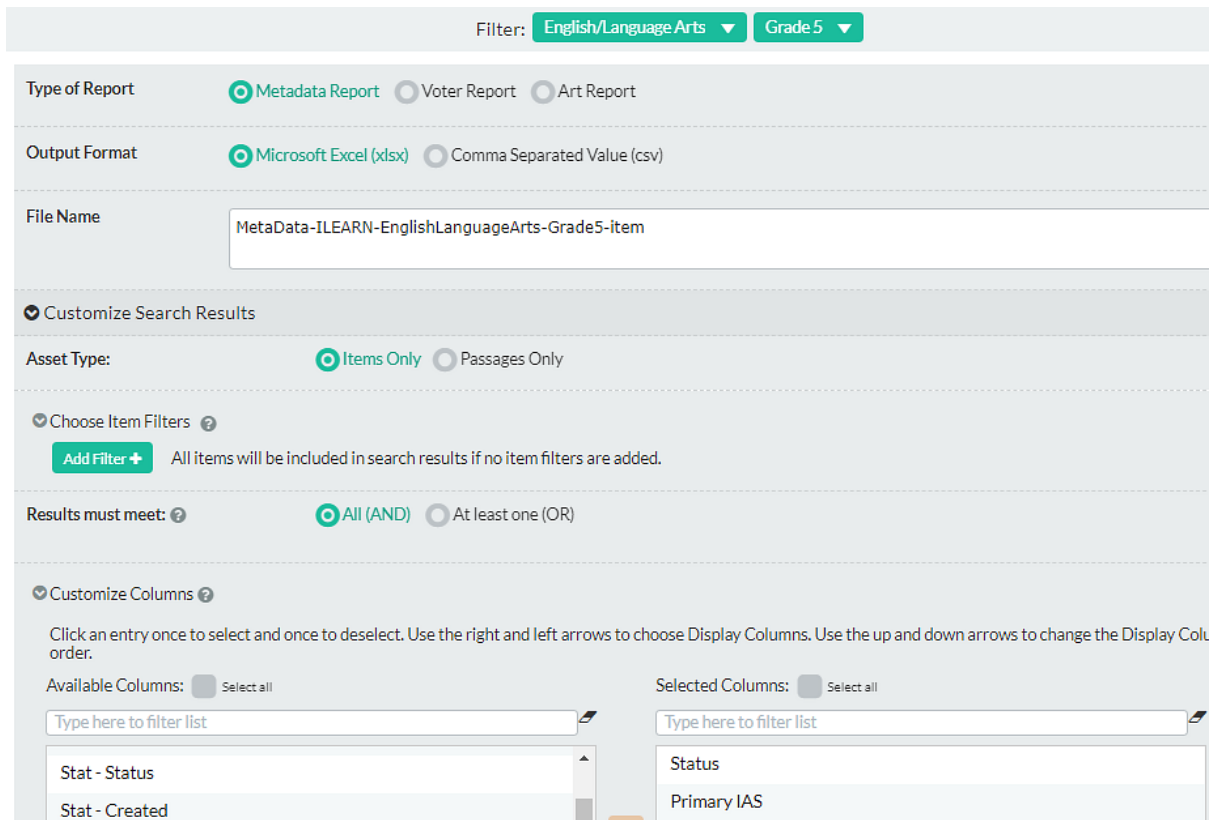
During the periods between established assessment windows, we maintain a 99.5 percent uptime level for each instance of Pearson Access Application Services provided to IDOE. This means that each instance of each Application Service will be accessible 99.5 percent of the time during any calendar month, except with excluded events, such as scheduled maintenance.

R e q u i r e m e n t

2.4.11   Describe available reports (standard and ad hoc) that are generated by the product. This should also include any reports with data analytics.

R e s p o n s e

ABBI can generate a series of reports that inventory the bank by subject and grade, providing users insight into the robustness of the IDOE item bank.

Reporting in ABBI. ABBI provides a user-friendly reporting interface allowing users to easily generate a variety of reports.

ABBI generates three basic reports: **Metadata Report, Voter Report,** and **Art Report**. Users can select filters to specify the data that displays on the selected report and choose to generate a Microsoft Excel (XLSX) file or a comma separated value (CSV) file for exporting.

By default, when the Metadata Report is generated, without setting any filters, it will display all passage metadata or item metadata, depending on the Asset Type selection. Another common use of this report is to create the template for metadata uploads. For example, a user may wish to move multiple items from one status to another. The user will filter the report to Items and Status and then edit the status column of the report. With proper permissions, the user can complete a Simple Import to move the group of items to the new status.

UIN	Status	Points (XML)	Standard(s)	Categorg y	Item Type	Interaction Types (XML)	Key(s)	Response Key (XML)	Calculator
KeywordTanslation0814	Operational`Ready for Operational Test	1.0	D.1.2.b	04	MC	choiceInteraction	A	A	No
GE016951609	Author`Imported	1.0	A.2.1, A.2.2			choiceInteraction	B	B	
GE008546039	Author`Create	1.0				choiceInteraction		A	
GE822741805	Author`Create	1.0				choiceInteraction		A	
GE822741113	Author`Create	1.0				choiceInteraction		A	
GE005543537	Author`Create	1.0				textEntryInteraction		1	

Metadata Report. This report is the most frequently used report for multiple purposes and provides information regarding UIN, item type, standard, cognitive level, and other metadata information.

By default, the Voter Report displays the UIN, the name of the voter, when the vote was made and any additional comments. The content team may then work with the client to reconcile any votes or comments suggesting changes to the assets. These reports help users track to the Asset Development Plan and can be used to identify areas for additional training and/or quality.

UIN	Grade	Committee Sequence	Voter Name	Asset Rated on	Vote	Comments	Asset Status
TECRScoring	16			Jun 29 2020 11:43:00 UTC	AcceptWithEdits		Author`Create
AddArtSample1	16	111		Apr 09 2018 18:54:32 UTC	AcceptWithEdits	comments	Review`Content Review`Ready for Content Review
_MC	16			Jun 17 2020 12:09:13 UTC	Accept	Comment	Author`Create
Item_MC_MC	16			Apr 19 2018 09:19:43 UTC	Accept	test	Author`Imported
CarnivMarsupialsMCCloze	16			Oct 11 2018 12:44:16 UTC	Accept	this is a great example.	Author`Create
CarnivMarsupialsMCCloze	16			Apr 09 2018 12:56:19 UTC	Accept	Accept as is. KA 4/9	Review`Content Review`Ready for Content Review

Voter Report. This report is often generated following a committee review and provides the UIN, grade, committee sequence, voter name, date asst rated, vote, comments, and asset status.

UIN	Subject	Grade	Screen Reader Alt Text	Text And Graphics Alt Text	Text Only Alt Text	Art File Name	Print Rendition	Art Status	Art Comments
934443615	General	16		abbi-default	abbi-exclude	scope			
934443615	General	16		abbi-default	abbi-exclude	microbes			
GE008438203	General	16		abbi-default	abbi-exclude	cleo 1			
GE00passage	General	16		abbi-default	abbi-exclude	cleo			
GE013332694	General	16		abbi-default	abbi-exclude	Pop up Glossary			
GE935129173	General	16		abbi-default	abbi-exclude	cleo 1		art`requested	
NumberingText	General	16		abbi-default	abbi-exclude	art			If you can keep you
SimpleImport1	General	16		abbi-default	abbi-exclude	chemistry-science-chemical-elements			

Art Report. This report identifies the UIN, subject, grade, and other related fields such as alt-text for screen readers, text and graphic alt-text, the art file name, the print rendition, the art status, and any comments.

Requirement

2.4.12   IDOE requires the delivery of secure items into the selected system and export of the items to outside vendors for development and deployment.

- Respondent must import all items into the selected solution.
- Respondent must ensure all content displays accurately and metadata fields are populated correctly.
- Respondent must export all newly developed items to an outside vendor as necessary. This is anticipated to be an annual delivery, and timelines for this work will be mutually agreed upon between the selected Respondent, testing vendor, and IDOE.
- Respondent must describe the transfer (import or export) of items in the product to outside entities.

Response

Secure and Accurate

The ABBI system uses multiple layers of quality control. All content can be verified for adherence to style, layout, and functionality requirements by using the ABBI TestNav Previewer. Scoring rules and logic can also be verified by using the ABBI TestNav Previewer.

Because ABBI is the single source for assets, states can be sure that the content packages that are delivered to them contain well-formed QTI XML, that all assets needed to publish and score the test are contained in the content package, and that the package contains the approved and validated version of the item.

Pearson will work with IDOE to verify that all item transfers are secure, accurate, and completed according to the project timeline, as specified in response to requirement 2.4.8.

> *Pearson has successfully completed many item bank migrations to the ABBI system, including the migration of the ISTEP and IREAD bank in 2015.*

Item bank transfers are also common practice at Pearson, and we have handled several secure and efficient item handoffs for IDOE over the past several years. The following sections detail the item bank import process, verification process, and transfer of secure materials from the ABBI system.

Importing Content and Metadata into ABBI

The import process begins with an evaluation of the source files because Pearson understands that different vendors have varying forms of QTI and/or item bank materials. QTI 2.1 is an industry standard, but there are usually subtle differences between vendors' application of the standard. ABBI has some content-aware features which are best utilized if imported content is tagged so ABBI can parse and utilize the data in the XML. In order to facilitate the ease of import, Pearson may apply a pre-import transform script (XSLT) that will modify the XML so ABBI can properly import and fully utilize the content within the assets.

Once this evaluation is complete a program specific transform is created and rigorously tested to normalize the item QTI for import into the ABBI system. Item content packages are processed using the transform and then imported into ABBI. This action creates the asset in the ABBI bank and loads the QTI-generated metadata. Passages are uploaded first to allow for the items to then be associated to its passage.

There are also tools available for importing metadata and item performance statistics into the ABBI system. Metadata and performance statistics can be imported either separately from the content, or with

the content (if it is encoded in the QTI item manifest). Multiple sets of learning standards or curriculum structures can be loaded into ABBI content banks. For example, a user may wish to load state learning standards as well as the Common Core standards. This enables a user to align IDOE content to both standards. Loading additional learning standards later will not affect either the existing learning standards or any content alignment that Indiana has already established.

Once the item content packages have been imported into ABBI and the items are created, the content metadata will be imported. This step also works as a quality check in that the metadata upload will fail for any UIN that is missing, indicating the item XML is missing from ABBI. The final step is to upload the statistics. This step is third as it relies on (1) the item existing in ABBI, and (2) the metadata's status is indicative of item with status. In other words, an item with stats should have a status of Field Tested, Operational, Released, or some other status which would indicate the asset has been administered.

Verification of Content in ABBI

Following the import of the content a verification check is completed to ensure processing is accurate and successful. Pearson Verification Team completes an item compare for all processed items. The items are viewed using the ABBI TestNav Previewer and verified against standard handoff materials of the item as it appears in the current system. This initial check is used to verify the item content was imported accurately, functions as expected, and basic scoring is working as expected. An additional scoring check is completed, by reviewers with content expertise, for more complex item types. Scoring checks are also completed using the ABBI TestNav Previewer.
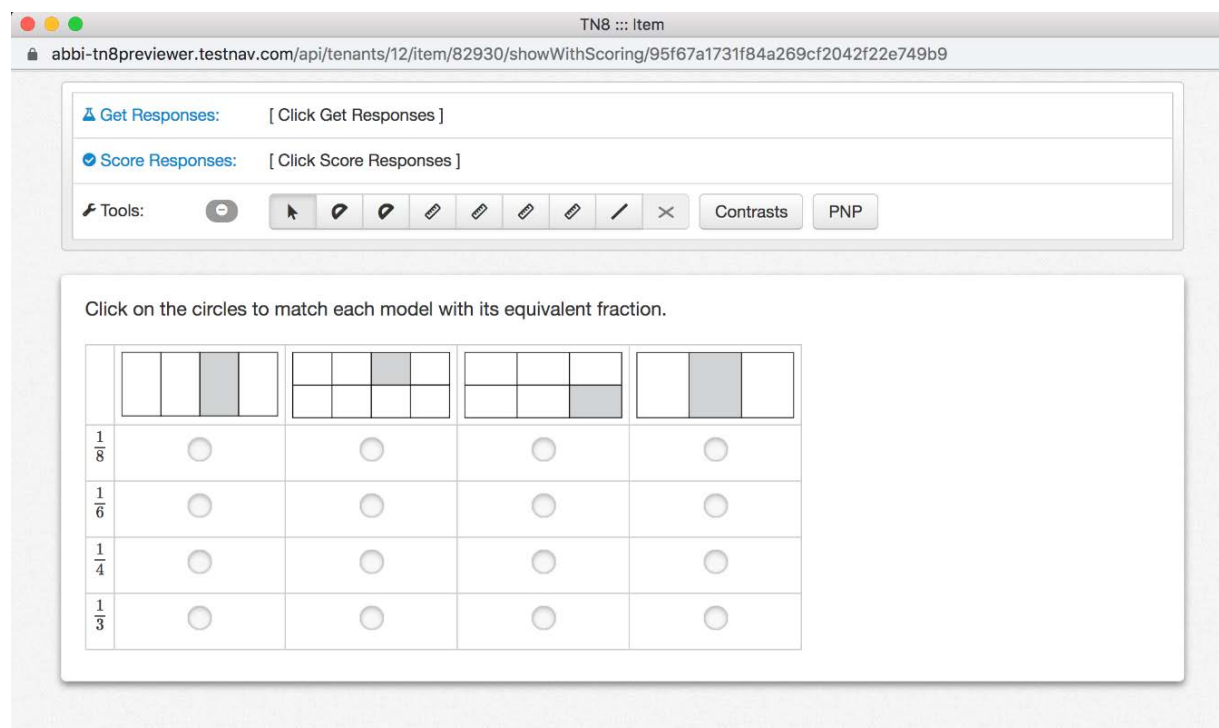
ABBI TestNav Previewer. Items can be previewed in TestNav to verify they look and behave as expected.

Export Content out of ABBI

The value of the content stored in the IDOE bank is diminished if it can't be easily exported. ABBI repositories come with potent export utilities that can export the IDOE entire bank content or by selecting

specific subjects, grades or other filtering parameters. The exports will generate QTI content packages that contain all item assets including associated asset files such as passages, art, video, etc.

ABBI's export capability also allows item variants to be generated from the same item XML source. For instance, an item's content may consist of the material to be seen by the student and annotations (e.g., rubrics, delivery instructions) intended for the teacher. Export options allow users to export either the teacher or the student version. Similarly, if the content has been extended with accessibility data and assets, export options allow users to produce multiple versions: with text-to-speech extensions, with American Sign Language videos included, or screen-reader ready versions. Similarly, variants that apply to print and online versions of an item when there are differences in image files can also be generated.

ABBI also provides tools for exporting metadata and item performance statistics. These can be exported separately from the content or along with the content (using the QTI item manifest structures). Pearson has worked with IDOE over the last several years to successfully transfer secure item content and metadata via Secure File Transfer Protocol (SFTP) site. All required materials have been made available and Pearson will continue to coordinate all export and import activities with IDOE and verify quality.

Requirement

2.4.13   IDOE requires security within the system.

Respondent must ensure all content is kept secure following the State's guidelines for data at rest and in transition. The Indiana Information Security Framework must be followed to the extent possible: https://www.in.gov/iot_credential/information-security-framework/.

Respondent must describe how Indiana-owned items will be stored within the system as an item repository for all test content owned by the state.

Respondent must describe the security features to allow only approved users to access the Indiana items in the product.

Response

A Secure System

Pearson takes **data security and privacy** extremely seriously. Because information within the ABBI solution must be available from the internet, it is imperative that sensitive information is encrypted so that only the intended recipient is able to view it. Pearson employs multiple data security and encryption methods to protect customer data, including PII. We use HTTPS, an encrypted method of passing data over the Internet via web-based systems. Transport Layer Security (TLS) works with HTTPS to ensure the data is encrypted as it is transmitted both internally and externally. Web-based services and application layer interface (API) calls use industry standard representational state transfer (REST) architecture to appropriately constrain and control data as it passes between components and across connections. Please see our response to requirement 2.4.14 for further information on security features.

ABBI is a secure web-enabled content creation and banking tool; its sophisticated role-based security system enforces control over who can access the banks, and further manages which content areas, grade levels, timeframes for access, and system functionalities each authorized user can access. For example, a committee reviewer may have view-only access for a limited period, while someone working on only a single subject and grade can have access to only a small portion of the bank.

More information about ABBI user roles and permissions are provided in our response to requirement 2.4.5.

Storing IDOE's Content

Secure and scalable content repositories are the bedrock of ABBI's content banking system. Built on top of the repositories is a range of powerfully smart tools that allow users to create, review, modify, track, and link the content in efficient, productive, and useful ways. By making IDOE's content banks highly configurable, ABBI quickly becomes a familiar toolset that allows users to concentrate on work, rather than the software tools.

Content repositories track all types of IDOE's content assets—from test items, art, and reading passages to scoring rubrics and metadata. Each asset has full revision history. This enables users to track program assets throughout the entire development lifecycle. Assets can be linked together in a variety of ways. For example, items can be linked to reading passages, assets can be associated with multiple learning standards, and assets can carry a customer-defined set of metadata.

Assessing User Access

ABBI User Audit reports are delivered twice per year (quarter 2 and 4) to functional managers and client services. The Audit report shows all users with access to the bank, their access to the program/subject/grades, and their roles in ABBI. The Audit reviewers will indicate if the user should retain access or be removed.

Whether performed internally by trained and experienced staff or externally by an independent third-party audit firm, if gaps or weaknesses in our security and privacy controls are identified, they are reported to the Pearson Assessments Information Security Office, whose staff works with business, legal compliance, and technical management to identify and implement appropriate remediation solutions.

Requirement

2.4.14   Describe the security features associated with the product to ensure items remain secure within the item banking features and in transit.

Response

Security Features

Pearson uses advanced security measures, such as at-rest and in-transit data encryption, firewall and web application firewall technologies, industry standard network access controls and authentication processes, and increased flexibility to provide data access to authorized users. In short, all personal identity information, test items and responses, and data considered sensitive or subject to regulatory compliance are encrypted at the host and remain so throughout all network transmissions.

Web Components and Transmission

Pearson employs HTTPS, an encrypted method of passing data over the Internet via web-based systems. Transport Layer Security (TLS) works with HTTPS to ensure the data is encrypted as it passes from our servers to the clients. Web-based services and application layer interface (API) calls use industry standard representational state transfer (REST) architecture to appropriately constrain and control data as it passes between components and across connections.

System Logging

Pearson's assessment platforms possess extensive logging and monitoring capabilities. Some logs directly feed real-time monitoring systems and dashboards, while other logs facilitate troubleshooting and forensic analysis. Examples of logged events include, but are not limited to:

- User provisioning and access level assignment

- Transmission of data and files

- System errors, aborts, and other events to enable detection of anomalous behaviors

In addition to overall, system-wide monitoring for suspicious and anomalous system activity, we also make sure our systems remain at current patch levels. We use a suite of tools to scan for vulnerabilities at the network, operating system, platform, and application layers.

Requirement

2.4.15   Describe how the solution is hosted and stored, via on premise or in the cloud, and the security features associated with the platform.

Response

ABBI is a secure, hosted solution that is designed to support the entire assessment content development life cycle. Pearson will host the IDOE item bank within ABBI in an established Amazon Web Services (AWS) environment, allowing for faster provisioning and initial onboarding. ABBI is supported by Pearson's Infrastructure and Operations team, who focus on delivering and scaling ABBI and other AWS-hosted products. The ABBI platform undergoes annual audits against the Service Organization Control 2 (SOC 2) auditing criteria to evaluate the controls that are in place to protect the platform and the data it holds.

Hosting our solutions in a virtual private cloud (VPC) gives our customers with the quality, security and scalability they expect. We have designed our platform to be cloud-native and dynamically scalable. Each assessment environment runs in its own instance, thereby gaining a measure of isolation from other environments and the ability to independently scale with the specific demands placed on them.

Pearson's approach to standing up and provisioning our systems in the cloud affords us the ability to maintain full control of incoming and outgoing data access traffic on a per-system basis. Instead of relying only on a centralized firewall perimeter, as is typical in brick-and-mortar data centers, our cloud-based architecture gives us increased cybersecurity protection through more granular control over what traffic is allowed in and out of the cloud. The VPCs that host our systems are isolated from other public cloud services, as well as from the public Internet. Because of these isolation and network segmentation options, customer data gains an inherently higher level of protection and isolation.

To access ABBI, users need a standard Chrome or Firefox browser with popups enabled. We will consult with IDOE technology staff as necessary regarding firewall, content filter, and other local settings to ensure IDOE staff have optimal network access to the secure ABBI site.

Appendix 1—Sample Training Resources

This appendix contains the following documents:

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- ██████████████████

Please note that all the materials in Appendix 1 are considered confidential and proprietary.